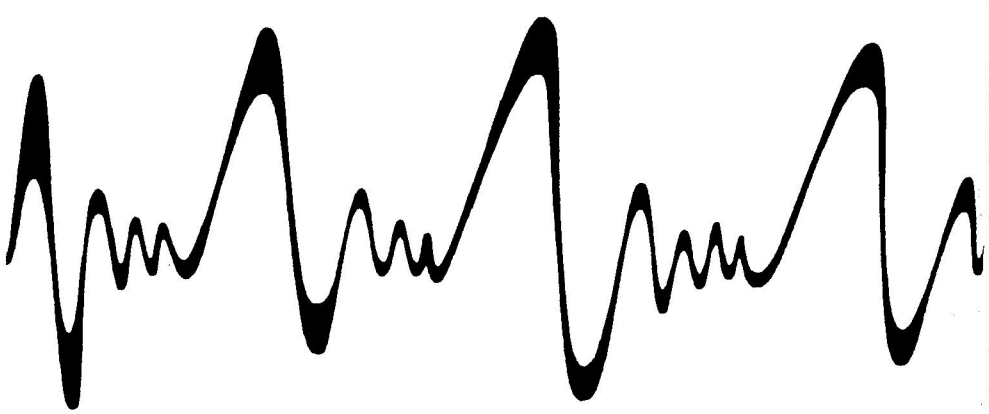
Studio RPC 400

Super HiFi

Bedienungsanleitung
Operating Instructions
Istruzioni per l'uso
Gebruiksaanwijzing



GRUNDIG

Allgemeine technische Daten
(nur für Rundfunkteil und dessen Verstärker)

Bestückung
96 Transistoren, davon 4 Leistungs-Darlingtons, 13 IC's; 114 Dioden; 5 Z-Dioden; 3 Gleichrichterdioden; 23 LED's; 3 Brückengleichrichter; 3 Keramik-Doppelschwinger

Überlastungsschutz
Die elektronische Automatik schaltet in allen Fällen von Überlastungen, also nicht nur bei Kurzschlüssen, den jeweils gestörten Kanal ab. Auch kapazitive und induktive Überlast wird von der Automatik sicher „erkannt". Die Endtransistoren sind damit sicher vor Zerstörung geschützt. Zusätzlich sind 2 Übertemperaturschalter an der Kühlschiene und am Netztransformator eingebaut, die bei Erreichen einer bestimmten Grenztemperatur das Gerät ausschalten. In beiden Fällen wird nach Beendigung der auslösenden Störung selbsttätig wieder eingeschaltet.

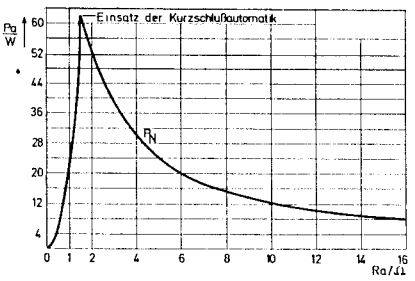
Stromversorgung
Für Netze von 110, 130, 220, 240 Volt ~ 50/60 Hz.
Leistungsaufnahme max. ca. 200 Watt;
bei TA ohne Signal: 33 Watt + 10 Watt Plattenspieler + 14 W Cassetten-Recorder

Sicherungen

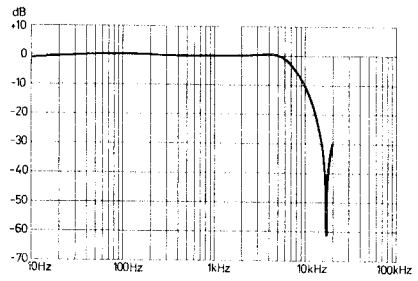
Netz:	110/130 V ~: 3,15 A/T
	220/240 V ~: 1,6 A/T
Sekundär:	2 x 6,3 A/T
	1 x 1 A/T
	1 x 630 mA/T
	1 x 315 mA/T
	1 x 200 mA/T
	1 x 160 mA/T

Beleuchtungslämpchen
2 x 6 . . . 7 V / 80 mA (Instrumente)
3 x 12 . . . 15 V / 100 mA (Skala)
1 x 12 . . . 15 V / 30 mA (Zeiger)

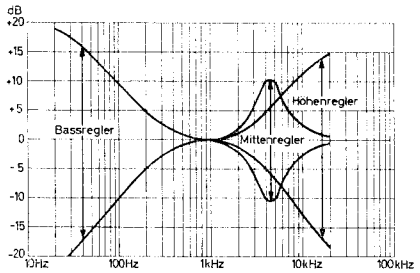
Weitere technische Daten auf den Seiten 9 und 10



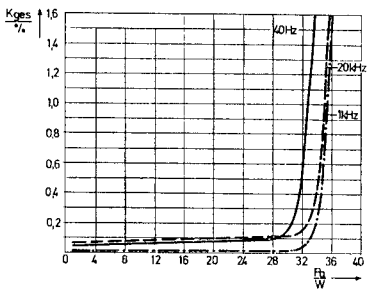
A) Ausgangsleistung bei 1 kHz über Ra. Nur 1 Kanal ausgesteuert



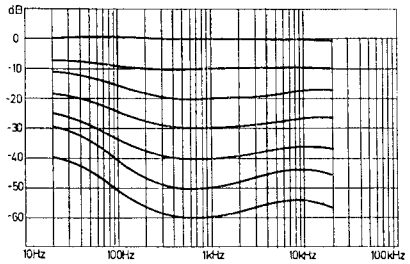
B) Frequenzgang des Rauschfilters, Meßeingang TB



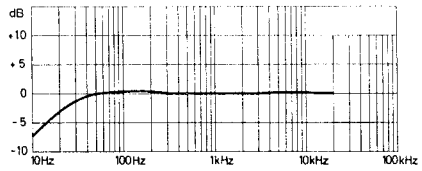
C) Wirkung der Klangregler, Meßeingang TB



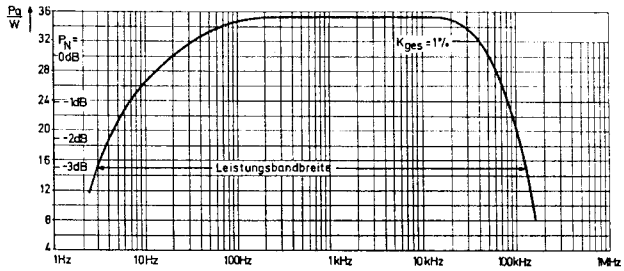
D) Klirrfaktor bei verschiedenen Frequenzen, 2 Kanäle ausgesteuert, Bereich L 1, Ra = 4 Ω, Meßeingang TB



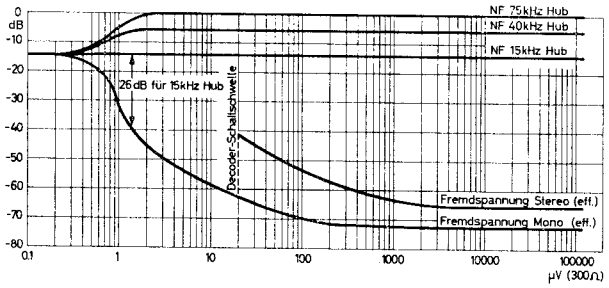
E) Gehörrichtige Lautstärkeregelung (Contour), Meßeingang TB



F) Frequenzgang, TA gemessen über Schneidkennliniennachbildung (RIAA)

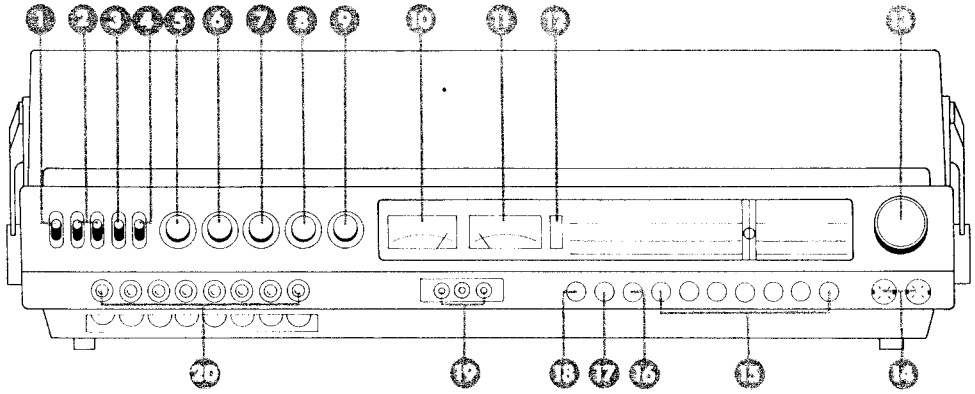


G) Leistungsbandbreite, TB, 2 Kanäle ausgesteuert



H) FM-Signal- und Fremdspannungsverlauf von Antenne bis Lautsprecher, bezogen auf Nennleistung

1



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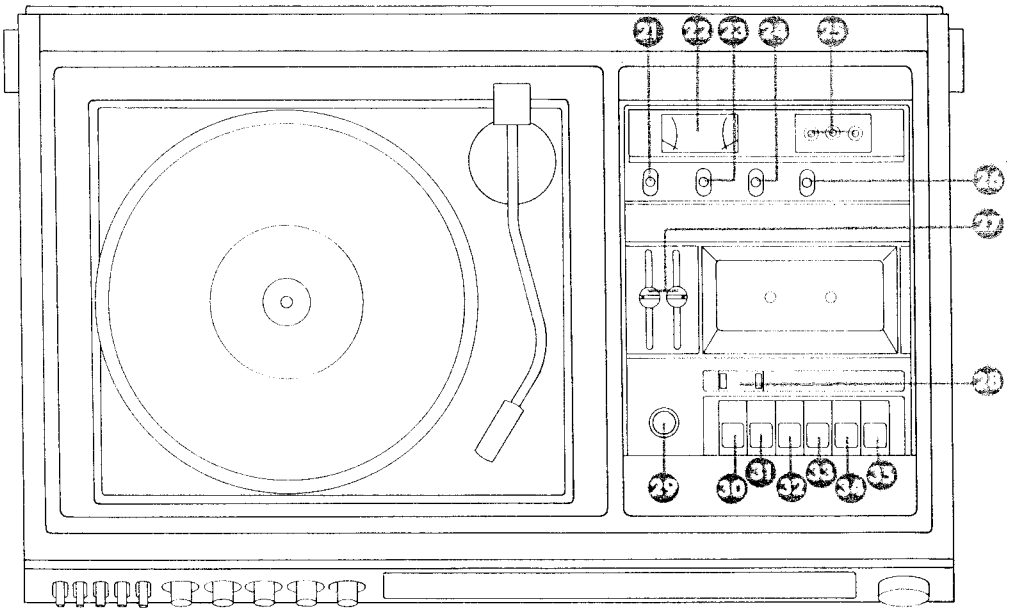

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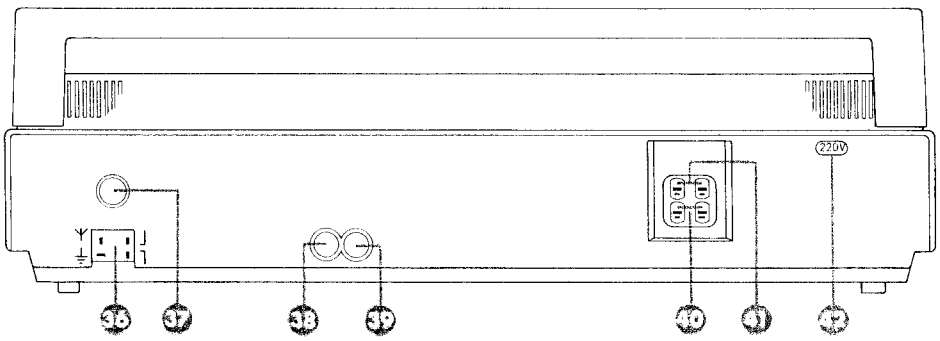

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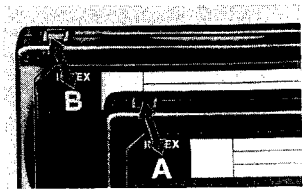

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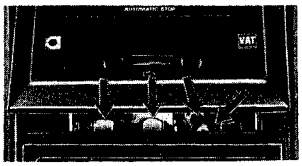


GB

Picture 1

① Mains switch
(top position = on; bottom position = off)

② Loudspeaker switches for stereo group 1 and 2
(top position = on; bottom position = off)

③ Noise filter switch
(top position = on; bottom position = off)

④ Contour / Linear switch
(loudness control)

⑤ Volume control

⑥ Bass control

⑦ Medium tones control

⑧ Treble control

⑨ Stereo balance

⑩ Frequency meter for FM preset programmes

⑪ Tuning meter / Field strength meter on FM

⑫ FM stereo indicator

⑬ Tuning knob

⑭ Stereo headphone sockets

⑮ Programme sensors

UKW	=	FM (VHF) band
MW	=	MW band
LW	=	LW band
TA	=	Playback of records from built-in record player
TB	=	Tape replay from an external tape recorder/ cassette recorder (also record player with ceramic or crystal cartridge)
CASS	=	Replay from built-in cassette recorder
MONITOR	=	For via tape monitoring when recording or on replay via the monitor socket using it as universal input

⑯ Muting sensor for FM tuning

⑰ AFC sensor

⑱ Mono sensor (FM only)

⑲ FM "Tunoscope"

⑳ Sensors for FM programming with tuning controls

Picture 2

㉑ Automatic/Manual record switch
(AUT.MUSIC = for automatic record level setting of music, AUTO. SP. = for automatic record level setting of speech, MANUAL = for manual record level setting)

㉒ Level meters
For visual indication of signal level on both record and replay. The meters are illuminated when the unit is switched on.

㉓ Tape type switch
(FeCr for Ferro-Chrome tape, Fe for Iron oxide tape, Cr for Chromium dioxide tape)

㉔ DOLBY-NR switch
(Symbol o indicates the DOLBY-NR unit is switched out)

㉕ DOLBY-NR, record (REC.) and tape travel (TAPE PILOT) LED indicators

㉖ On/off switch (Cassette recorder)
(● = on; O = off)

㉗ Record level controls
For separate level setting on MANUAL record of both channels

㉘ Counter (Position indicator)
With reset button (O-SET) and MEMORY button for easy location of individual recordings on rewind

㉙ Microphone socket

㉚ Record key with the possibility of fade in/out when recording (VAT)

㉛ Start key

㉜ Rewind key

㉝ Forward wind key

㉞ Pause key
Press to temporarily stop the tape travel

㉟ Stop key, pressing it again will open the cassette compartment

Picture 3

㊱ Connecting sockets for:
AM aerial (LW, MW) ⋎, earth ⏚, and FM dipole ⊓⊓ (300 Ω)
(between the sockets is located a wire link)

㊲ Socket for aerial rotator

㊳ Connecting socket for external tape recorder/cassette recorder or record player with ceramic or crystal cartridge

㊴ Monitor/Universal input socket
For via tape monitoring

㊵ Loudspeaker connecting sockets, stereo group 1
(L = left channel; R = right channel)

㊶ Loudspeaker connecting sockets, stereo group 2

㊷ Mains voltage indicator
If it becomes necessary to change the voltage setting, it should be changed by an experienced technician only

Important
The auto-change spindle must be removed from the record player before attempting to close the plastic dust cover, otherwise the cover may be damaged.
The case of the unit should be treated as a piece of furniture. The unit should not be subjected to high temperatures or high humidity and should only be cleaned with a soft cloth (preferably anti-static). Never use abrasive polishes or cleaning agents as the surface will almost certainly be damaged.

The German Federal Postal Authorities draw your attention to the fact that the 'General Sound and TV-Radio Licence' entitles you only to install and to operate sound, TV and radio receivers. Only radio transmissions and no other kind of transmissions may be received by means of these sets.

Mains Connection
This set has been designed to be operated on AC and is preset for 220 V. For operation on an other mains voltage, the voltage setting should be changed by an experienced technician according to the indications given inside the unit.
The built-in record player and cassette recorder are automatically set to the correct voltage.

Additional information for sets used in Great Britain
Fit or have fitted a 13 A 3-pin plug and fit the plug with a 3/5 A fuse. Connect the brown wire of the mains lead to the live pin, marked "L" or red or brown and the blue wire to the neutral pin, marked "N" or black or blue – on no account must either of the wires be connected to the earth pin, marked "E" or green or green/yellow.
Units sold in Great Britain are set to 240 V.
Important: Disconnect from the mains supply by removing the mains plug from the wall socket when not in use for long periods.

Aerials
In primary service areas good results can be obtained on FM with a simple room dipole eg: GRUNDIG FM strip dipole.
For the best possible results we recommend the use of an outside FM dipole especially when receiving stereo broadcasts. Remember 10 times as much aerial signal is required when receiving a stereo transmission. Even an outside FM dipole may not be suitable in mountainous regions or for long distance reception unless it is mounted as high as possible above the roof of the house.
On the back of the unit there are four flat sockets for aerials and earth ㊴. The two sockets on the right are for connecting a 300 Ω FM dipole. When an outside FM dipole is used AM reception may also be improved because the AM and FM aerial sockets are connected together via a shorting link mounted between the two sockets.
If separate outside aerials for FM and AM or a communal aerial system is being used, the shorting link must be removed otherwise inter-action between the two aerials will occur.

If you are not sure of the signal conditions in your area and remember that a good signal is essential for optimum stereo reception, we suggest you contact your dealer who will be pleased to advise you as he will be familiar with the conditions for reception in your area.
Socket ⅄ is intended for the connection of an external AM aerial.
Socket ⏚ is for earth connection.

Loudspeakers
For best possible reproduction we suggest you use high quality high wattage loudspeakers with your Studio. The best results will be obtained with 4 Ω (min. 3.2 Ω) loudspeakers (loudspeakers of lower impedance should not be used). Loudspeakers with an impedance of up to 16 Ω may be used but the amount of power the amplifier can deliver will be limited.
Two pairs of connecting sockets are mounted on the rear of the set (L1 and L2) – ㊵ and ㊶. It is possible to use both sets of loudspeakers simultaneously in separate rooms.
The set will deliver its maximum power (2 x 50 W music power, 2 x 30 W sine) when the speaker sockets L1 or L2 are used separately.
When both L1 and L2 are used simultaneously the set will deliver 4 x 30 W music power.
Always make sure that the right-hand loudspeaker unit is connected to the RH socket and vice versa.
Note: Loudspeaker extension cables are available in 5 metres length (cable 375 a) and 10 metres length (cable 376 a)

Headphones
2 sockets ⑭ conforming to DIN 45327 are provided on the right of the wave band buttons. Headphones are particularly suitable for the music lover who wishes to listen undisturbed. Headphones of 5 to 2000 Ω impedance may be used. We recommend the GRUNDIG headphones 215, 219 or 221.

Switching On and Off
The receiver is switched on and off by means of the toggle switch ① situated on the far left. Top position = on; bottom position = off.

Loudspeaker Selection Switches
The toggle switches ② allow to switch on and off separately the two loudspeaker groups. Top position = on; bottom position = off.

Programme- and Function Selection
By touching the appropriate sensor field the following functions can be selected:
⑳ U 1 . . . U 8 = VHF / FM sensor fields for fixed stations

⑮
- UKW = VHF / FM reception, for tuning in a station on the main scale
- MW = Medium wave
- LW = Long wave
- TA = Replay from built-in record player
- TB = Replay from an external tape recorder/cassette recorder or record player with ceramic or crystal pick-up (which must be connected to the TB socket)
- CASS = Replay from built-in cassette recorder

Station Tuning on Main Scale
Tune in the desired station with the TUNING control ⑬. Tune for maximum deflection on the tuning meter ⑪. This meter is also used as field strength meter on FM (see corresponding paragraph).

Volume Setting
Adjust the volume with the knob ⑤.

Stereo Radio Reception
Your Studio is equipped for the reception of FM stereo transmittors using the FM-multiplex system (MPX). The integrated circuit stereo "PLL" decoder is fitted with an automatic switch so that the receiver is automatically switched to stereo when a stereo transmission is received. This automatic switch is effective when the MONO sensor ⑱ is not activated (must not light up). To release touch sensor again. The red stereo lamp ⑫ will light up as soon as a stereo programme is received.
Under poor reception conditions, or if stereo is not required, the receiver may be switched to mono by simply touching sensor ⑱.

Automatic Frequency Control on FM (AFC)
The automatic frequency control is in operation when the AFC sensor ⑰ is touched (light = on, no light = off). It locks in a station once it is tuned in. When tuning in a different FM station switch off the AFC by releasing the AFC (touch sensor again). Do not use the automatic frequency control to receive a weak station close to a much stronger one otherwise the receiver will lock onto the stronger station of the two with the automatic frequency control in operation.

FM/VHF Muting
With the MUTING sensor ⑯ touched, interstation noise will be muted when tuning on the VHF/FM band. If you want to receive very weak stations it is advisable to switch the muting circuit off by touching sensor ⑯ again, as a weak station may be suppressed together with the noise.
With a control located below the MUTING sensor the preset response value of muting may be adjusted to the reception conditions. The control has been adjusted at the factory to ensure normally a good muting function. Turning the control to the left by means of a small screwdriver increases the sensitivity. The stronger a FM station is being received, the more the control has to be turned to the right (decreasing sensitivity) so that a station may not be suppressed together with the noise.

FM Sensor Fields
The Sensor fields U 1 ... U 8 ⑳ permit pre-selection of up to eight FM stations. These are tuned in by the knurled wheels below the fields on the bottom of the unit and you then only have to touch the appropriate Sensor field to obtain the desired programme. For pre-selection proceed as follows:

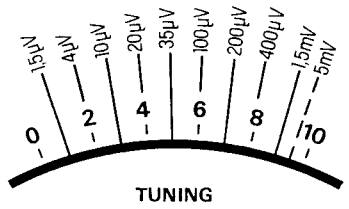
- Switch off the AFC
- Touch the desired Sensor field (it lights up).
- Tune in the desired station by turning the knurled wheel below the selected Sensor field. Tune for maximum pointer deflection on the tuning meter ⑪. Meter ⑩ shows you the approximate frequency of the station.
  Proceed in the same way for each of the eight Sensor fields. The Tunoscope ⑲ is an additional great tuning aid on FM – see corresponding paragraph.

When all the desired stations have been stored the AFC should be switched on again. It will ensure correct tuning when a station is recalled.

FM "Tunoscope"
The three light emitting diodes ⑲ permit easy and accurate tuning of FM stations, For this first switch off the AFC. Now tune in the desired FM station so that only the middle green LED lights up. The left or right red LED will light up if the station is not accurately tuned in. If both red LEDs are lighting, only a very weak station or no signal at all is received. Switch on the AFC again after having tuned in the station.

Aerial Rotator
The RPC is fitted with a rear mounted socket ㊲ for connection to the "programmatic-rotor" aerial rotator manufactured by Stolle & Co. The position of the aerial rotator can be programmed when the VHF stations are being tuned. When a station is recalled by touching one of the Sensors the VHF dipole will automatically be steered towards the transmitter.

FM Field Strength Indicator
The tuning meter ⑪ of the set serves also as field strength indicator.
This is particularly useful for the proper orientation of a rotating multi-element FM dipole. It is also possible to identify the locally strongest FM transmitter from others, all transmitting the same programme. A properly orientated aerial – allowing maximum field strength reception – also reduces multi-path reception caused by signal reflections. The use of the field strength meter also shows if any particular programme is received with a sufficiently high signal



The shown aerial voltages are approximate values only.

level. The high sensitivity of the set ensures perfect reception for the majority of transmitters, even if these only marginally exceed the ambient noise level. For stereo transmissions, on the other hand, the aerial signal must be at least ten times greater. Technical limitations and the method of stereo transmissions are the reason for this. The lower level for stereo receptions with this unit is 20 µV.

Tone
The bass, medium and treble tones can be adjusted separately and independently using the controls ⑥, ⑦ and ⑧.

Balance Stereo Control
The relative output between left and right loudspeakers can be adjusted with the balance control ⑨. The control can be used to compensate for poorly positioned loudspeakers or unfavourable room conditions.

Low Pass Filter
If the lever switch ③ is moved to the top the filter is operative. With the filter switched on all frequencies above 7 kHz are suppressed. The filter is particularly useful for removing high frequency hiss or distortion (noisy tapes or old gramophone records).

Linear / Contour Switch (loudness compensation)
The contour facility is to compensate for the change in frequency response of the human ear as the sound intensity is reduced. As the volume control is reduced through medium to low volume the bass and high frequencies are progressively boosted to alter the tonal balance.
If the lever switch ④ is moved to the LIN. position no treble or bass boost will take place as the volume is reduced. We recommend the switch ④ be used in the linear position when large loudspeakers (having superior bass response) are used and also when speech is being reproduced. For all other conditions we recommend the switch be set in the CONT. position.

Record Player
The built-in record player is fitted with a magnetic cartridge wired internally to the amplifier. To replay a gramophone record the TA sensor ⑮ must be touched.
Please read the record player instruction book carefully.
The set is permanently wired for stereo operation, but when a mono gramophone record is played it will automatically be reproduced in mono through both loudspeakers.

TB Socket (Universal socket)
The TB socket ㊳ on the rear of the set can be used to connect a tape recorder or a cassette recorder for both record and replay. Recordings can be made from the internal cassette recorder to an external tape / cassette recorder or vice versa both in stereo and mono.
The TB socket can also be used for connecting an external record player fitted with a ceramic or crystal cartridge (or a record player fitted with a magnetic cartridge and pre-amplifier).
The TB sensor ⑮ must be touched to replay or to record onto the built-in cassette recorder any signal presented to the TB socket. As previously mentioned all mono signals available from equipment according to modern standard will be replayed through both left and right hand channels, however to ensure that signals from equipment of older standard are replayed through both left and right hand channels (in mono), a adaptor plug (GRUNDIG no. 294) must be used. Before connecting a tape recorder or cassette recorder to the TB socket be sure to read the instruction book supplied with the product carefully.

Simultaneous Rerecording
During radio reception and replay of records, it is possible to record the corresponding programme (radio or record replay) simultaneously onto the built-in cassette recorder or – via the Tape socket ㊳ – onto an external tape / cassette recorder.

Via Tape Monitoring
This set is provided with a monitor socket (pos. ㊴) which permits via tape monitoring when recording onto a tape machine being designed for monitoring operation. Connect the Monitor socket with a standard lead (e. g. GRUNDIG lead 242) to the corresponding socket on the tape machine. If you now touch the Monitor switch ⑮, the recording is continued without interruption, but the receiver amplifier is connected to the playback contacts of the Monitor socket and you will hear the just recorded signal. By touching the Monitor sensor repeatedly, you can compare the just recorded programme with the original programme, and thus check the recording.
Note: During monitor operation, the muting circuit is off. It can later be switched on again. The monitor socket can also be used for connecting a second tape recorder / cassette recorder (replay) or record player fitted with a ceramic or crystal cartridge.

Cassette Recorder Section
For recording and playback in stereo with chromium dioxide-, ferro-chrome- and iron oxide tape cassettes.
Automatic level control for recording, can be switched off for manual level control.
Dolby NR system * for noise suppression.
"VAT" button for variable fade in/out when recording (VAT = variable auto-fade technic).
Counter with memory function on rewind.

Switching ON/OFF
is effected by means of the toggle switch ㉖ (● = on; O = off). Separation from the mains is effected with the mains switch ① on the radio unit.

Tape Type Selector Switch
Set switch ㉓ to required position:
Cr = Chromium dioxide cassette
Fe Cr = Ferrochrome cassette
Fe = Iron oxide cassette
GRUNDIG cassettes are marked accordingly.
The tape type selector switch has no effect on replay.

Dolby NR Switch
If you wish to make a Dolby recording, the switch ㉔ must be moved to the DOLBY NR position. The Dolby indicator ㉕ will light up. The symbol o indicates the Dolby NR unit is switched off.

Inserting the Cassette
Press the STOP/CASS key ㉟, the cassette compartment will spring open. Insert cassette (rear first) with the full spool on the left, then close the compartment lid. Having recorded one of the two stereo tracks of the cassette tape, the cassette may be turned over and the other track used. For track identification the cassette is marked with the letters A and B. Recordings will be made on the tape track who's index points upwards. In the same way, when playing pre-recorded cassettes, the titles must point upwards. The arrow on the compartment lid indicates the running direction of the tape in the cassette.

Automatic Recording
We suggest when making your first recording you use the automatic record facility. Set the switch ㉑ to AUT. MUSIC for music or AUTO. SP. for speech. Press the pause key ㉞ (it locks), then the record key ㉚ (does not lock) and hold it till the start key ㉛ has been depressed. The red LED-indicator ㉕ will light up showing the unit is ready to record. The automatic circuit will set the correct record level. The operation can be checked by watching the level meters ㉒, the pointers move in rhythm with the speech or music and the correct position for the pointers is in the white area of the meter scale. In the case of radio recordings make the adjustment during the transmission of music or speech. For microphone recordings try to find the loudest part of the dialogue or music. In the case of a gramophone recording or a tape copy, try to find the loudest passage.

* NR-System manufactured under licence from DOLBY LABORATORIES.

After this return the pick-up arm to the beginning of the record or rewind the tape you want to copy. Now, release the pause key ㉞ and the tape will start to run. The green LED-indicator tape pilot ㉕ lights up as an indication of the recording function. The recording can be blended in if before the tape starts moving the REC/VAT key ㉚ is depressed and then released slowly after releasing the pause key. The recording can also be faded out by depressing the REC/VAT key slowly before tape travel is being stopped.
Note: When recording from the built-in radio unit or from the record player, or when re-recording via the TA/TB (phono/tape) socket, no equipment must be connected to the microphone socket ㉙. Whilst recording, it should be avoided to tune to another station or to change the wave-band, as this would affect the automatic recording level circuit.

Manual Record Level Setting
Set switch ㉑ to position MANUAL. Separate level controls and level meters ㉒ for both left and right hand channels are provided. For mono recordings both level controls ㉗ must be set simultaneously. When recording stereo the recording level of the left and right hand channels must be set independently. When recording from microphone the slider controls can be set independently to compensate for the positioning of the left and right channel microphones. Press pause key, record key and start key in this sequence.
A short test should be made, as for automatic recording. Push both slider controls towards position "10" and watch the pointers of level meters, which will fluctuate in sympathy with the speech or music to be recorded. The correct meter reading is when the pointers just reach 0 dB (beginning of the red field) during the loudest passages of speech or music. As soon as the pause key is released by pressing it again, the tape will start to run and commence recording.

Microphone Socket (MICRO)
Socket ㉙ on the cassette unit allows you to connect a condenser microphone, e. g. GRUNDIG GCMS 332 (for stereo) or GCM 319 (for mono). For stereo recordings it is also possible to connect two mono microphones via an adaptor lead 278 a. Basically connection of high and low impedance microphones is possible.
For contact arrangement of the socket see circuit diagram. Before recording, a short test should be made to allow the automatic level circuit to adjust to the correct level. For recording onto the built-in cassette deck, it is also possible to connect a second record player with crystal or ceramic pick-up or a second tape recorder to the microphone socket.

Short Interruptions
You may stop the tape for a short time during recording (e. g. during musical transmissions to make an announcement) and during play-back if you depress the PAUSE key ㉞. If you want to go on release the key by pressing it again.

Stop and Removal of the Cassette
When you have finished a recording lightly press the STOP/CASS key ㉟. The key releases the START key. To remove the cassette fully depress the STOP/CASS key again, the cassette compartment will open. The cassette can be turned over or be replaced with a fresh one for further recording.

Fast Wind
In order to listen to your recording it must first be rewound to the beginning. If however, you wish to play a position further on, the cassette must be wound forward to the desired position. For fast forward wind press key ㉝, for rewind press key ㉜ (both lock). When the required tape position has been reached depress the STOP/CASS key.

Automatic End of Tape Stop
When the end of a cassette is reached, the tape is stopped and the function keys released.

Counter with Memory Function (Position Indicator)
The counter ㉘ is set to 000 by depressing the small button (0-SET) adjacent to the counter. When starting to record always write down the counter reading together with the title (and also at the end of the recording when there is still tape left for further recordings). For playing back also set the counter to 000 after fitting the cassette. Then, by winding the tape forward you can select any title you wish by referring to the counter. This of course is only applicable if the cassette has been fully rewound before it is inserted.
The counter also makes it possible to exactly locate a certain tape position on rewind. For this depress the small lockable MEMORY key adjacent to the counter. On record and playback the required position to be found later on can be marked by depressing the small O-SET key adjacent to the counter. The counter is set to 000 at the same time. The required position can also be marked without stopping the tape. If the tape is wound back it will stop exactly on the required position. Here for example, a new recording may be started if the recording is of bad quality or not wanted. The MEMORY key has to be released on rewind by pressing it again, so that the tape is not stopped unwanted.

Playback
Touch the CASS sensor ⑮ on the receiver. Then depress the START key on the cassette recorder. Volume, tone and balance are adjusted the same as for radio operation.

Safeguard Against Inadvertent Erasure
Commercially recorded tape cassettes lock the record key and so protect the tape against inadvertent erasure. You can safeguard your own recordings on the cassette if you
break the appropriate safety catch, off the opening, situated directly behind the track index **A** or **B** at the back of the cassette (see fig. 4 on page 3). Each track can be protected separately. Should you want to erase and re-record the track in question stick some Sellotape or similar over the opening.

Treatment of Tapes
Please do not put your cassettes on top of central heating radiators or near any other heat source. The tape will become deformed and useless. Cassettes which are not used should be put into the provided wrapping to protect them from becoming contaminated and to avoid formations of tape loops.

Maintenance of the Cassette Recorder
The set has been designed to give service free operation for long periods. A built-in head cleaner, cleans the head surface at every start-stop-phase. If a fault should occur please do not try rectify it yourself. Repairs should be carried out only by qualified engineers. If the heads become dirty open the cassette compartment and press the START key. Clean the front of the heads, the capstan shaft and the pressure roller (marked with arrows in fig. 5 on page 3) with methylated spirit or oil free petrol, use a soft cloth. If the parts are excessively dirty, you can also use a match.
Under no circumstances should the head surfaces be touched with a metallic, magnetic or other hard object. It could render your machine useless, resulting in costly repairs.
After cleaning depress the STOP key before inserting a cassette and closing the cassette compartment.
The tape heads can be cleaned quickly and easily using the GRUNDIG cleaning cassette 461. Insert the cassette, close the cassette compartment and depress the START key. Let the tape run for approximately 5 minutes.

Accessories

Microphones:
Condenser microphone GCM 319 for mono recordings.
Condenser microphone GCMS 332 for stereo recordings.
Dynamic microphone GDM 314 for mono recordings.

Tape Cassettes
GRUNDIG Studio Cassette LHS, chromium-dioxide cassette or ferro-chrome professional cassette, available as **C 60** (with 2 x 30 minutes playing time) or as **C 90** (with 2 x 45 minutes playing time).
GRUNDIG cassettes are subjected to constant quality control checks and guarantee the best possible electrical and mechanical performance. We therefore recommend the use of GRUNDIG cassettes.

Cleaning Cassette 461
For simple quick cleaning of the tape heads. Simply run through on playback. (approx. 5 minutes running time).

Connecting Lead
Type 242, 2.5 m length, with 5-pole standard plug on each end, for connecting a second cassette- or tape recorder.

Adaptor 297
To reduce the low frequency content providing more natural speech reproduction when commentating or interviewing.

Technical Specifications
(Cassette Recorder Section)

Mains Supply: plugged to the radio section

Fuses: secondary (located in mains section of RPC 400)
Motor 630 mA, surge resisting
Amplifier 315 mA, surge resisting

Transistors: 43

FET: 3

Diodes: 30 + 3 LEDs

IC: 1

Tape cassette: compact cassette according to DIN 45 516

Track System: International 1/4 track

Tape Speed: 4.76 cm/s (1⅞ ips.)

Fast Wind Time: approx. 85 sec. for C 60

Frequency Response:
with Cr, FeCr } 30 Hz – 15 kHz

Signal/Noise Ratio:

Normal:	Cr	57 dB
	FeCr	60 dB
	Fe	58 dB
Dolby-NR:	Cr	64 dB
	FeCr	67 dB
	Fe	65 dB

Wow and Flutter: ≦ 0.2 % according to DIN

Microphone Socket:
8 pole standard socket, the middle contact of the socket supplies the voltage for GRUNDIG condenser microphones.
Microphone input: 2 x 1 mV . . . 200 mV at approx. 45 kΩ
Gramophone input: 2 x 25 mV . . . 5 V at approx. 1 MΩ

Output:
approx. 0.9 V at approx. 3 kΩ
Output is plugged to the radio section.

Technical Specification Radio Section

Waveband coverage:

VHF / FM	87.5 . . .	108 MHz
LW	145 . . .	350 kHz
MW	510 . . .	1620 kHz

Sensitivities:
VHF / FM: 1.4 µV in 300 Ω or 0.7 µV in 75 Ω and 15 kHz deviation for 26 dB noise.
AM: MW Band 10 . . . 17 µV
LW Band 7 . . . 13 µV

$\frac{\text{Noise + Signal}}{\text{Noise}}$ = 6 dB; m = 30 %

Aerial Sockets:
FM: VHF/FM dipole 300 Ω
AM: External Aerial and Earth

Circuits:
FM: 16
AM: 7

Intermediate Frequencies:
FM: 10.7 MHz; AM: 460 kHz

FM Limiting:
Limiting Point, (–1/–3 dB): 1.3/0.9 µV in 300 Ω

Bandwidth:
FM-IF, 150 kHz (approx)
AM-IF, 4.3 kHz (approx)
FM-demodulator: 850 kHz

IF Noise:
FM: ≧ 90 dB
AM: ≧ 60 dB

AM Suppression:
≧ 50 dB at 1 kHz, measured with 22.5 kHz deviation and 30 % modulation at 1 mV in 300 Ω.

Image Rejection:
FM: ≧ 56 dB
AM: MW 52 . . . 63 dB
LW 47 . . . 57 dB

AFC Accuracy (VHF/FM):
Switchable, capture range ± 550/500 kHz

Capture Ratio:
≦ 1.5 dB for – 30 dB noise at 1 mV in 300 Ω and 40 kHz deviation.

FM Signal to Noise Ratio:
To DIN 45 405 in the range 31.5 . . . 15 kHz at 40 kHz deviation and 30 Watts output:
Mono/Stereo: ≧ 67/60 dB at 50 mW output:
Mono/Stereo: ≧ 62/56 dB

Frequency Response (VHF/FM):
Better than DIN 45 500, from aerial to speaker output:
40 . . . 6 300 Hz ≦ ± 1.5 dB
6.3 . . . 15 000 Hz ≦ ± 2 dB

Stereo Pilot Leakage:
≧ 55 dB at 19 kHz
≧ 50 dB at 38 kHz

Distortion Factor:
Mono/Stereo: ≦ 0.5 % at 1 kHz and 40 kHz deviation measured at 2 x 27.5 W in 4 Ω (DIN 45 500)

Stereo Decoder:
Integrated circuit PLL decoder with automatic indicator and RF level Mono/Stereo switching. (Level set for 20 µV in 300 Ω).

Stereo Crosstalk:
1 mV at aerial and 47.5 kHz deviation:
1 kHz ≧ 40 dB
250 . . . 6300 Hz ≧ 38 dB
6.3 . . . 10 kHz ≧ 35 dB

Safety Circuits:
To all European norms and IEC Regulations, etc.

De-emphasis:
50 µ/secs (norm)

FTZ Nr. U 101

Audio Amplifier Section

Output Power:
measured to DIN 45 500 in 4 Ω.
Loudspeaker group 1 or 2:
100 W music power = 2 x 50 W
60 W nominal power = 2 x 30 W
at THD ≤ 0.2 % (20 Hz . . . 20 kHz):
55 W sine power = 2 x 27.5 W
Loudspeaker groups 1 and 2:
120 W music power = 4 x 30 W

Frequency Response:
TB: 20 . . . 20 000 Hz ± 1.5 dB
TA Magnetic: 20 . . . 20 000 Hz ± 2 dB

Power Bandwidth:
⟨5 . . .⟩ 100 000 Hz at 1 % distortion (to DIN 45 500)

Intermodulation:
≤ 0.3 % at full output, measured at 250 Hz and 8000 Hz with a ratio of 4 : 1 (to DIN 45 403)

Signal to Noise Ratio:
(to DIN 45 405) for 30 W / 50 mW
TB/Cass./Monitor: ≧ 80/62 dB (input 500 mV)
TA: 63/56 dB (input 5 mV)

Stereo Crosstalk:
≧ 36 dB in the range 20 . . . 20 000 Hz
≧ 55 dB at 1 kHz

Input Sensitivity and Impedance:
Sensitivity for 30 Watts output:
TA: 1.4 mV/47 kΩ
TB/Cass/Monitor 170 mV/≧ 470 kΩ.
The phono input is equipped with an equaliser-pre-amplifier. Equalisation at 3180–318 and 75 μsecs.

Input Overload Point:
TA: ≧ 45 mV
TB/Cass./Monitor: ≧ 5.8 V.

Volume Control:
The accuracy of the volume control setting, per channel is 2 dB in the frequency range 20 . . . 20 000 Hz. With the loudness circuit in operation this figure might be slightly degraded.

Treble Control:
– 17 dB to + 14 dB at 16 kHz, not affected by the setting of the volume control.

Medium Control:
± 10.5 dB at 4 kHz, not affected by the setting of the volume control.

Bass Control:
– 17 dB to + 16 dB at 40 Hz, not affected by the setting of the volume control.

Balance Control:
Setting range: – 13 dB to + 3 dB

Noise Filter:
Roll off, – 3 dB at 7 kHz.

Output Facilities:
a) 4 loudspeakers to DIN 41 529 (Impedance 4 Ω. Minimum impedance 3.2 Ω) for stereo in two separate rooms. It is permissible to connect loudspeakers with an impedance of up to 16 Ω provided that the associated loss in output power can be tolerated. The amplifier is fitted with an automatic short circuit protection device which comes into operation when the output load falls below 1.5 Ω.
b) 2 sockets to DIN 45 327 for connecting 2 sets of stereo headphones. Output impedance in the range 5 to 2000 Ω.

Damping Factor:
The internal impedance of the amplifier is 0.15 Ω and when connected to a 4 Ω load this will give a damping factor of 28 dB. This damping factor is improved when using loudspeakers of a higher impedance.

Technical Specification

General Data for Radio Unit with Amplifier

Semi-conductors:
Transistors: 96 (including 4 "Darlington" pairs)
IC's: 13
Diodes: 114 + 23 LED + 5 Zener diodes
Rectifiers: 3 bridge rectifiers and 3 diodes
Ceramic filters: 3

Overload Protection
The circuit has been designed so that it will sense open and short circuit loading conditions. It will also sense over capacitive or over inductive loads and the automatic overload protection circuit will then operate. Thermal protection devices have also been fitted to the mains input transformer and onto the heatsinks of the output transistors. These transistors are therefore protected against destruction by overload and high operating temperatures. Should a fault condition occur these overload protection circuits will reset themselves when the fault has been cleared.

Mains supply:
110, 130, 220, 240 V AC 50/60 Hz
Power consumption: approx. 200 W max., without signal: 33 W + 10 W record player + 14 W cassette recorder

Fuses:
(Mains)
110/130 V AC: 3.15 Amp, surge resisting
220/240 V AC: 1.6 Amp, surge resisting
(Secondary)
2 x 6.3 Amp, surge resisting
1 x 1 Amp, surge resisting
1 x 630 mA, surge resisting
1 x 315 mA, surge resisting
1 x 200 mA, surge resisting
1 x 160 mA, surge resisting

Lamps:
2 x 6 . . . 7 V / 80 mA (Instruments)
3 x 12 . . . 15 V / 100 mA (Scale)
1 x 12 . . . 15 V / 30 mA (Scale pointer)

The right is reserved to alter specification or operational details without prior notice.

Diagrams on page 2

A) Output power versus load resistance at 1 kHz on RL, only one channel driven

B) Frequency response for noise filter, measuring input TB

C) Effective range of tone controls, measuring input TB

D) Distortion factor versus frequency, both channels driven, RL = 4 Ω, measuring input TB

E) Characteristics of realistic volume control (Contour), measuring input TB

F) Frequency response

G) Power band width, TB, both channels driven

H) FM Signal/Noise ratio, measured from aerial to speaker

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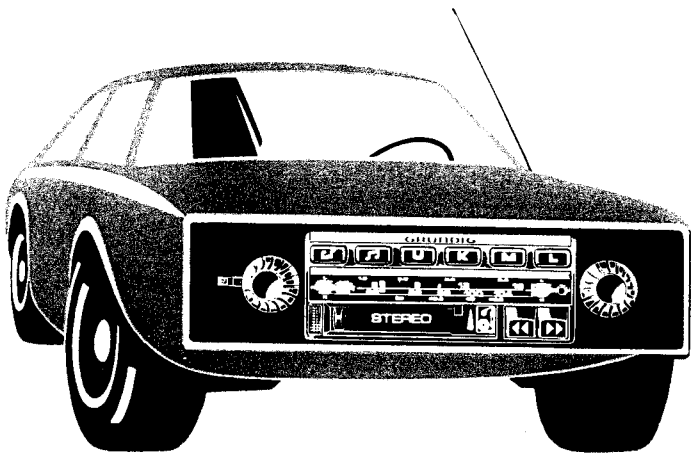
GRUNDIG

Weltklang Cassetten-Autosuper



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